AMENDMENTS TO THE CLAIMS

The following claim set replaces all prior versions, and listings, of claims in the application:

1. (Original) A method for detecting a phase in a cardiac cycle comprising the steps of:

(a) optically detecting movements of an anatomic structure affected by cardiac activity;

(b) deriving a cardiac signal in response to said optically detected movements which is indicative of a phase in a cardiac cycle; and

(c) generating a trigger signal in response to said derived cardiac signal which is indicative of said phase of the cardiac cycle.

2. (Original) The method of claim 1, wherein step (a) is practiced by inserting an optical fiber esophageal probe into an esophagus

3. (Original) The method of claim 2, which comprises directing laser light onto a site within the esophagus through at least one optical fiber in the probe, and receiving reflected light from said esophagus site through at least one other optical fiber in the probe.

4. (Original) The method of claim 3, which comprises directing said reflected light to a photodetector which derives said cardiac signal therefrom.

5. (Original) The method of claim 4, which comprises receiving the derived cardiac signal from said photodetector and generating said trigger signal therefrom.

6. (Original) A method of conducting magnetic resonance (MR) microscopy comprising the steps of:

(a) optically detecting internal anatomic physical movement in response to rhythmic periods of cardiac activity and inactivity during a cardiac cycle;

(b) conducting MR microscopy during said periods of cardiac inactivity; and

(c) using the derived cardiac signal to produce cardiac images at specific phases of the cardiac cycle.

7. (Original) The method of claim 6, wherein step (a) includes deriving a cardiac signal indicative of said rhythmic periods of cardiac activity and inactivity.

8. (Original) The method of claim 7, wherein step (a) further includes generating a trigger signal in response to said derived cardiac signal of said periods of cardiac inactivity.

9. (Original) The method of claim 6, wherein step (a) includes generating a trigger signal in response to said optically detected periods of cardiac inactivity.

10. (Original) The method of claim 6, wherein step (a) is practiced by inserting an optical fiber esophageal probe into the esophagus

11. (Original) The method of claim 10, wherein step (a) is practiced by optically detecting esophageal movements indicative of said periods of cardiac activity and inactivity

12. (Original) The method of claim 11, comprising directing laser light onto a site within the esophagus through at least one optical fiber in the probe, and receiving reflected light from said esophagus site through at least one other optical fiber in the probe.

13. (Original) The method of claim 12, which comprises directing said reflected light to a photodetector which derives said cardiac signal therefrom.

14. (Original) The method of claim 13, which comprises processing the derived cardiac signal by receiving the derived cardiac signal from said photodetector and generating said trigger signal therefrom.

15. (Original) A magnetic resonance (MR) microscopy method comprising the steps of:

(a) inserting an optical fiber probe into a vertebrate esophagus;

(b) illuminating a site of the esophagus with light emitted by said probe;

(c) detecting reflected light from the esophagus site by a photodetector coupled optically to said probe;

(d) determining movements of the esophagus at said site indicative of rhythmic periods of cardiac activity and inactivity based on said detected reflected light and generating an output signal therefrom; and

(e) providing said output signal to a MR scanner and synchronizing MR microscopy in response to said detected periods of cardiac inactivity.

16. (Original) The method of claim 15, wherein the vertebrate esophagus is the esophagus of a laboratory animal.

17. (Original) The method of claim 16, wherein the laboratory animal is a rodent.

18. – 30. (Cancelled)

31. (New) A method of conducting magnetic resonance (MR) microscopy using a MR microscopy unit, said method comprising the steps of:

(a) deriving a cardiac signal indicative of rhythmic periods of cardiac activity and inactivity by optically detecting internal anatomic

physical movement in response to rhythmic periods of said cardiac activity and inactivity during a cardiac cycle;

(b) generating a trigger signal in response to said derived cardiac signal being indicative of said periods of cardiac inactivity; and

(c) operating the MR microscopy unit in response to receiving said trigger signal so that MR microscopy is conducted only during said periods of cardiac inactivity.

32. (New) The method of claim 31, wherein step (a) is practiced by inserting an optical fiber esophageal probe into the esophagus and operating the esophageal probe to derive said cardiac signal.

33. (New) The method of claim 32, wherein step (a) is practiced by optically detecting esophageal movements indicative of said periods of cardiac activity and inactivity

34. (New) The method of claim 33, comprising directing laser light onto a site within the esophagus through at least one optical fiber in the probe, and receiving reflected light from said esophagus site through at least one other optical fiber in the probe.

35. (New) The method of claim 34, which comprises directing said reflected light to a photodetector which derives said cardiac signal therefrom.

36. (Original) The method of claim 35, which comprises processing the derived cardiac signal by receiving the derived cardiac signal from said photodetector and generating said trigger signal therefrom.